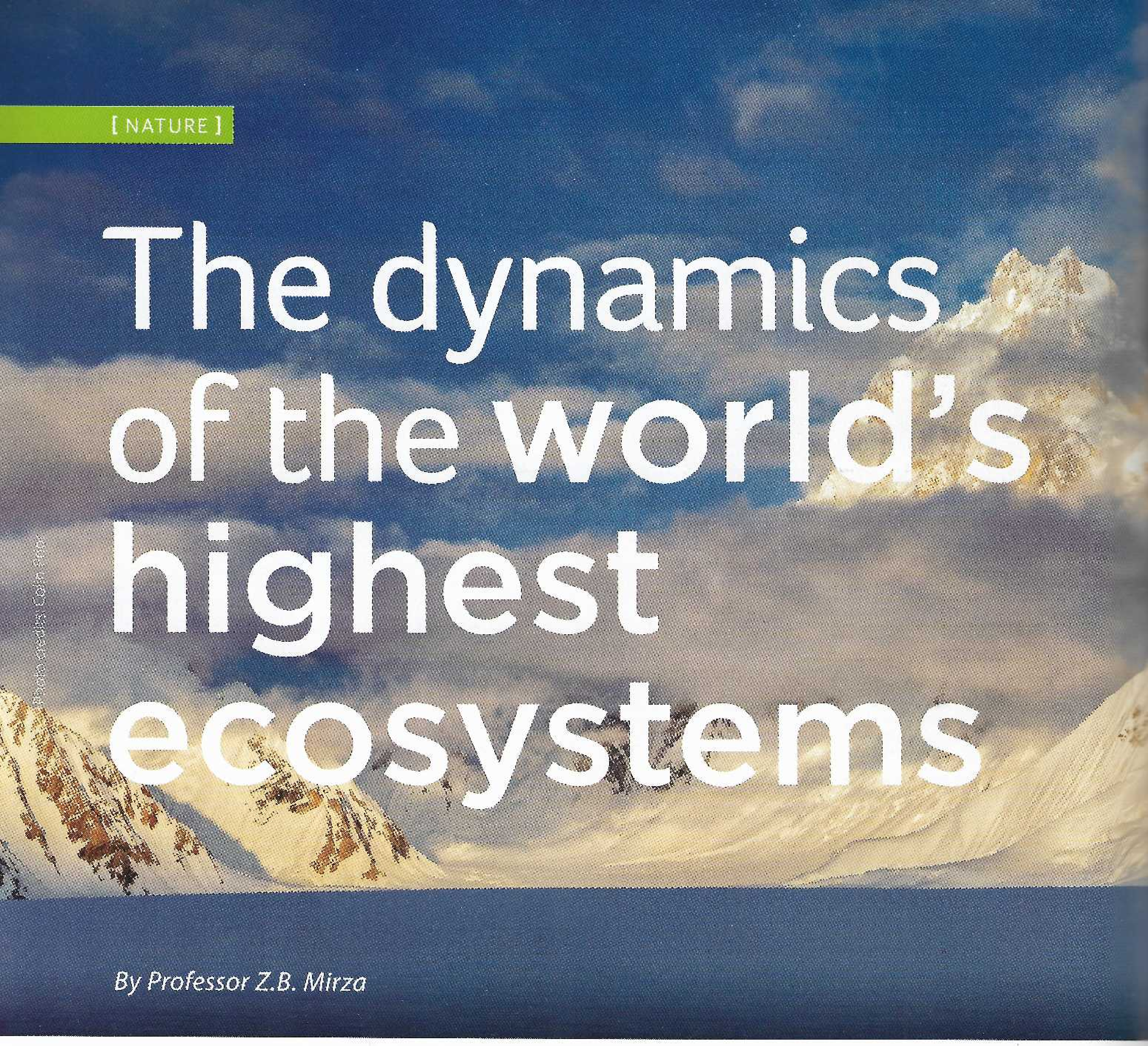


Photo credits: Colin Prior

[NATURE]

The dynamics of the world's highest ecosystems

By Professor Z.B. Mirza

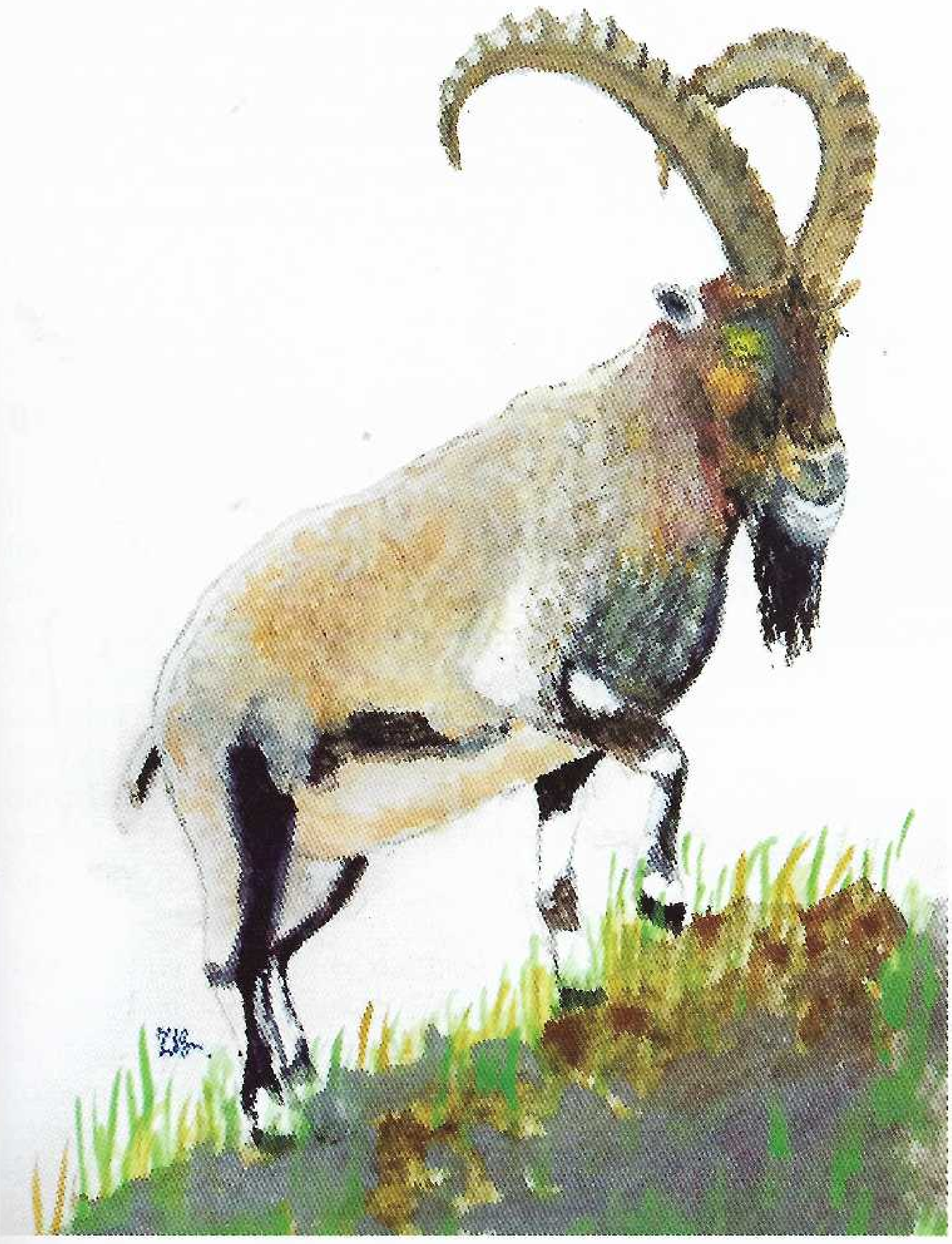
The Himalaya, Karakorum and Hindukush Ranges are the world's highest remote wild habitats, where the world's highest ecosystems operate, and where the peaks of the ranges remain covered with snow the whole year round, where the air is cold caused by adiabatic cooling and it is dry, with changing low or high pressures and thermal currents.

Below the snowline, during short summer season of these heights the animals show astonishing abilities to adapt to the harsh abiotic conditions of this 'Alpine Tundra' Eco zone, through their morphology, physiology and ethology. Here the plants are small, prostrate and have hairy coverings to give them insulation from wind and extreme day and night temperatures. In this Eco zone the lifecycles of the plants are also short and depend on how early the snow melts. Flowering is quick and the pollinator insects' visit is also short. The insectivorous birds can be seen for a short duration. Same with the raptors. At higher altitudes as autumn comes earlier with the fall of temperature, the plants also dry up earlier.

This Eco zone extends downwards where the temperatures are not too cold or so windy to obstruct the growth of shrubs and stunted trees. Further downwards, temperatures are less harsh with the decreasing elevation.

Interestingly, the alpine tundra eco zones of the Hindukush and Karakorum ranges have Eurasian animals, whereas, Himalayan Ranges have mingled of Eurasian and Indo-Chinese animals and plants in its alpine tundra Eco zone. This zoogeographical blend in the Himalayan Alpine Tundra eco-zone makes the functioning of the ecosystems unique and interesting.

THE MONARCHS OF THE SKYHIGH HABITATS



The Himalayan Ibex

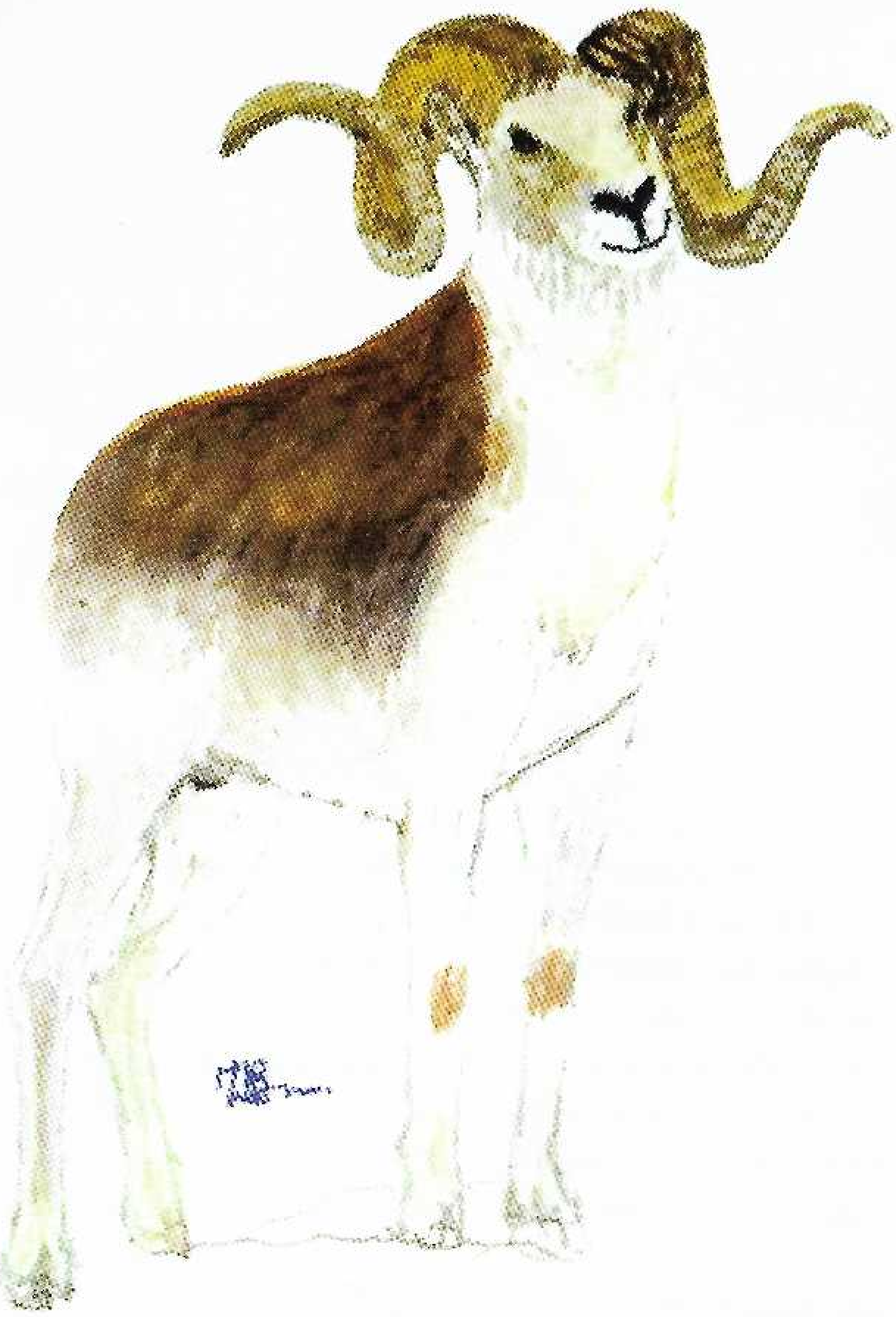
Despite the fact that the males are heavy bodied, weighing between 60 to 130 kg., they live on steep slopes and rocky scree, well above the tree line. The females are much smaller, weighing almost half the weight of the males and they remain at lower heights, more in the meadows, where they feed alpine grass and herbs. These then remain well-nourished and often have twin births and occasionally, triplets are also born. In winter the males also descend to lower heights, where snow cover is not deep and they can find dried leaves and twigs, buried under the snow which they uncover using their feet. These are so surefooted goats that they find food on the steep slopes, where the snow slides. Vertical cliffs also save them from predation.

During the rut season in winter, males also descend to the areas where the mixed herds of females and their yearlings are. Clashes start among males for dominance over each other and end after this is achieved. After a short period of mating, females start rejecting males. That results in sexual segregation. The males that are energy exhausted or injured during the entire process of rut and breeding, are less difficult for the predators to chase and kill by the predators like snow leopard and wolf. The young ibex and the kids have more enemies like the Lynx, fox and the Golden Eagle. But the more alerts survive, and the rest go in the high-altitude food-chain.

Markhor (Capra Falconeri)

During the summers the adult male markhors also prefer to be on the steep slopes, but not very high up where the Himalayan Ibex live. The Markhor habitat has sparse stunted growth trees and bush growth. Tussocks of grass are more available. They tend to remain lonely and spend a lot of time mostly grazing and browsing, in their higher altitudes summer habitats. They chew regurgitated cud when they rest. The females remain in scrub forested slopes. They are more active in the mornings and evenings. In springs and early summers, they mainly graze newly grown nutritious grass. To drink water, they have been observed to descend as low as 1,500 meters. In winter the males start descending to the temperate forests where chilgoza pine, junipers and oaks grow. They browse the oak leaves, often by standing on their hind legs to reach the leafy branches. The females and the younger males often climb the oak trees to browse.

The rut season is in winter, as in Himalayan Ibex, which continues daily, for a month. At the end, both the winners and the defeated all get exhausted from the energy gathered during the whole year's feeding. During the winters, particularly in the snowy season, fodder is least available to the herbivores. The oak trees, which remain green in winter even in heavy snow, provide the browsing of the leaves, also to the males to recover from exhaustion. The females too, get the additional nutrition which they need for embryonic development in their wombs. The injured or weak males and some weak yearling kids are eliminated by the predators, while the old Markhors that suffer malnutrition due to worn-out grinding and chewing teeth also become the food of the predators. Thus, the ecosystem makes the surviving Markhor populations healthy, vigilant with keen eyesight and a strong sense of smell to detect nearby predators. Snow leopards and lynx are the main predators. Golden Eagle is a predator of kinds and junior adults.



Marco Polo Sheep (Ovis Ammon Polii)

In Pakistan it is found in fewer numbers in the extreme northwestern area of Khunjerab National Park, district Hunza. Males come from across the border from China to graze on gentle slopes in winters, at 4,693 meters (15,397 ft.) above sea level. Their fodder plants that grow here are the grasses and small herbs that are adapted to the extremely adverse climatic conditions of the cold high altitudes. These plants are also cherished by domestic sheep, goats and yaks. Hence these nutritious plants remain almost overgrazed in the high-altitude habitats. Marco Polo sheep faces severe food competition as well as the risk of diseases from domestic livestock.

The rut of the male Marco Polo Sheep is in late November and may go up to the first week of December. One or two lambs are born mostly in May. Adult males and females are vigilant and give alarm snorts on spotting any potential enemy. Then they often jump on their four legs in unison to release secretion from their pedal glands before they flee. The smell from this secretion alerts other individuals scattered to grazing. Their role in the food chain is to sacrifice their weaker and most senior adults or even the weaker lambs to the predators like Snow Leopard, Wolf, Lynx and Golden Eagle, which also share their habitat. However, the predation is also not always successful, as every individual predator is not always strong or quick or may not have yet developed hunting ability, being immature and inexperienced. Such predators may have to face hunger and ultimately their death. The author once watched an attack of a golden eagle on a marmot collecting food from a green patch in boulder land for winter storage in its burrow. The flying predator swooped, but the marmot moved behind a boulder just a moment before the eagle's sharp and strong talons could touch it. The poor bird strongly struck the boulder and died. I found it was a sub adult of the same year. It had not yet acquired the skill to lift up in time with or without prey. Nature eliminated it, leaving fit and smart of its kin to enjoy life.

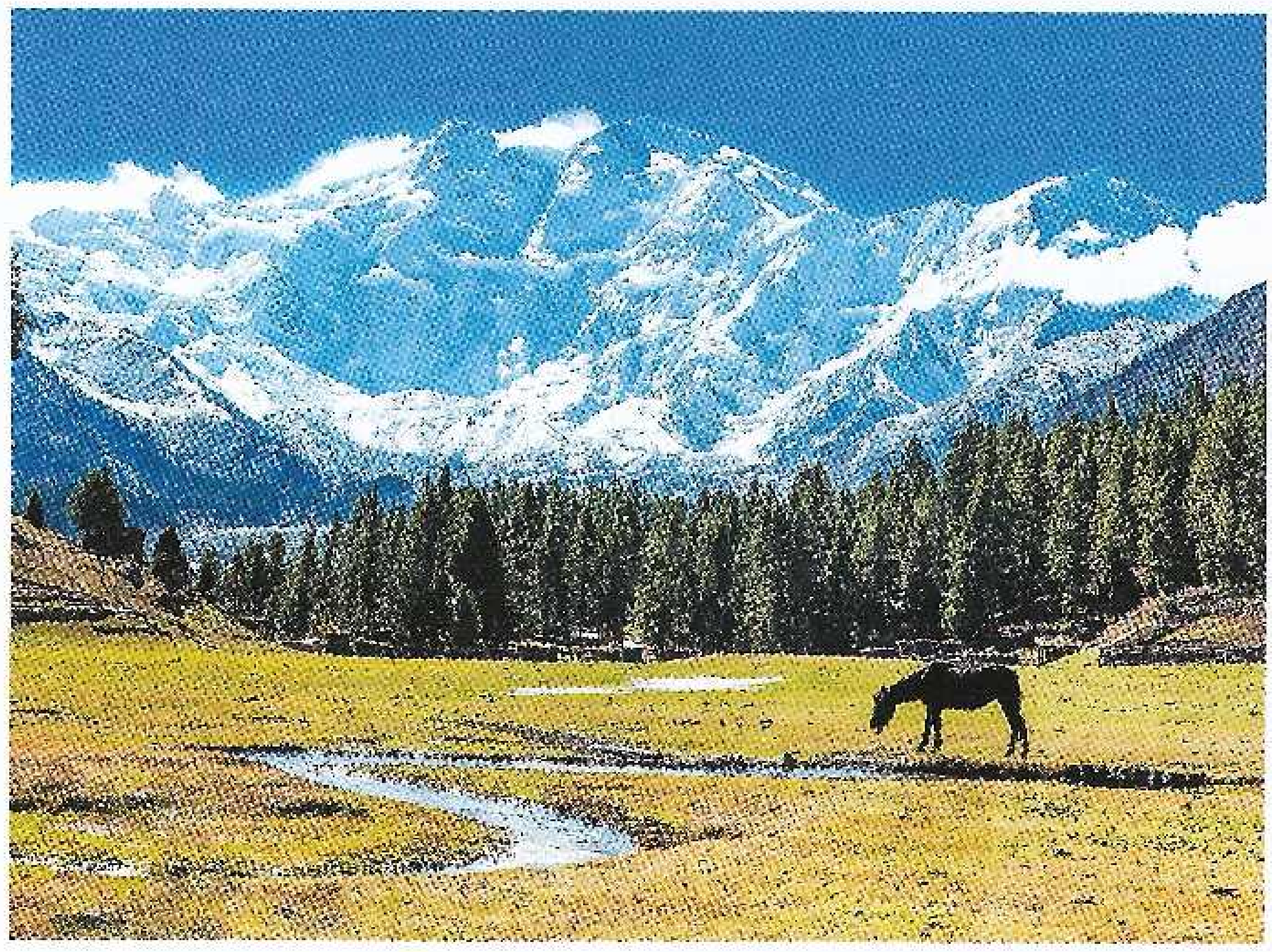
Bharal or Blue Sheep (Pseudois Nayaur)

It is found in herds in the dry alpine ecozone in Shimshal Valley, at Hunza - Tibet Border, which is at 4,735 meters (15,535 feet) elevation. The herd prefers to graze in gentle slopes with a ground cover of grass and sedge between meadows and bushes. But the animals remain close to cliffs, to which they run to climb and escape when they sense predation. These are active mostly in early mornings, before the arrival of the domestic livestock for grazing, their competitors in the pastures. In the afternoons when the domestic livestock herds recede to their night resting places, Blue Sheep again becomes active. During the summer, senior males segregate from the herd and remain in areas higher than the females, junior males and the lambs. These areas are usually difficult and with lesser food plants than the areas of the herd from which they had segregated.

The principal predator of the Blue Sheep is the Snow Leopard. Upon sighting an enemy, it freezes. Its colour pattern makes it so perfectly camouflaged that it often escapes predation. However, if spotted by the predator or the predator moves closer, it runs and attempts to climb high to more difficult spots. The Golden Eagle is a predator of lamb.

Blue sheep is an important prey species for snow leopards. In 2007, an outbreak of scabies in blue sheep (Sarcoptic mange) may have caused a food reduction for snow leopards. This infection was first reported in 1996 by the local herders. Although scabies spread through animal-to-animal contact, pathogenic mites may have been picked from grassy pastures by

the blue sheep, where domestic livestock herds are also brought for grazing. All age groups, both males and females, were in poor condition with severe and extensive skin lesions for over the next ten years. The population of Blue sheep in this area and also across the border in China was drastically reduced.



After the snow melts in early summers, grass, sedges and meadows grow in scattered patches. The blue sheep finds time to graze in these patches early in the morning or late in the afternoon. During the rest of the day the local herdsmen graze their livestock. In these pasture patches the larvae of the ticks of domestic livestock are hatched in thousands and transferred to blue sheep. Perhaps Scabies mites also transfer in the same way. The shortage of pasture patches causes grazing competition between domestic livestock and wild animals. Dogs of the herders are also brought to care for the herds. The arid rocky habitat usually has shortage of plant food that causes domestic livestock concentrations in the pastures and transmission of skin parasites that bring disease and mortality in Blue Sheep and reduction of food for Snow Leopard, which then turns to domestic livestock predation. This results in herdsmen's retaliation and all the time human-snow leopard conflicts. The ecosystem remains in jeopardy.

With increased human intervention, stress on the habitat also increases; thus, the eco system challenges remain a concern. We need to continue our efforts for the support of conservation.

About the Writer

Professor Z.B. Mirza is an active senior scientist of 85 years of age in the field of Biodiversity, Ecology, Mammalogy and Ornithology. He is skillful in all techniques of making Natural History Museums. As an artist, he is an illustrator of all types of biodiversity and habitats and has illustrated many conservation awareness materials. He has authored over 60 research publications and 27 books on the subject of his specialty, three country reports and 15 technical reports. One of his books was given 'Best Book Award'. He is internationally as well as nationally decorated, including 'two Lifetime achievement Awards'. He is Chairman of Snow Leopard Foundation, member of Islamabad Wildlife Management Board and Chairman of its Scientific Committee. He was a member of IUCN International Education Commission, member international working group IBP, visiting faculty, Kinnaird College for Women, Lahore, for 22 years, Arid Agriculture University, and Quaid-i-Azam University for six years, served University of Maryland for three years, Punjab University, for six years. He was among the pioneers to start WWF Pakistan. He was first the Director In charge of Pakistan Museum of Natural History, Islamabad. He was Consultant Biodiversity in the South Asia Cooperative Environment Programme of SARC countries for six years. These days he is also a professional Consultant for EIAs and Management Plans. He also keeps himself busy in the field, supervising field research of students.